



Spectral Gamma-Ray Borehole Log Data Report

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Borehole

40-08-12

Log Event A

Borehole Information

Farm : <u>S</u>	Tank : <u>S-108</u>	Site Number : <u>299-W23-216</u>
N-Coord : <u>36,070</u>	W-Coord : <u>75,767</u>	TOC Elevation : <u>664.00</u>
Water Level, ft :	Date Drilled : <u>6/30/1978</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>125</u>	

Borehole Notes:

This borehole was drilled in June 1978 to a depth of 130 ft. The borehole was started with an 18-ft length of 8-in. surface casing and completed at a depth of 125 ft with 6-in.-diameter casing. The 18 ft of surface casing was removed on completion of the borehole and the annulus between the portion of the borehole wall drilled with the 8-in. casing and the permanent 6-in. casing was grouted. Grout was also placed in the bottom 5 ft of the borehole as the 6-in. casing was withdrawn from the drilled depth (130 ft) to the completion depth (125 ft).

The thickness of the permanent casing wall is assumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. steel tubing.

The zero reference for the SGLS logs is the top of the casing. The casing lip is approximately even with the ground surface.

Equipment Information

Logging System : <u>2</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>05/1996</u>	Calibration Reference : <u>GJPO-HAN-5</u>	Logging Procedure : <u>P-GJPO-1783</u>

Log Run Information

Log Run Number : <u>1</u>	Log Run Date : <u>06/18/1996</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>19.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>2</u>	Log Run Date : <u>06/18/1996</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>123.5</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>18.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>



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Analysis Information

Analyst : H.D. Mac Lean

Data Processing Reference : P-GJPO-1787

Analysis Date : 03/28/1997

Analysis Notes :

This borehole was logged in two logging runs using a centralizer.

The pre- and post-survey field verification spectra for each log run met the acceptance criteria established for peak shape and system efficiency. The energy and peak-shape calibration from the post-survey field verification spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging runs. There was negligible gain drift during the logging runs and it was not necessary to adjust the established channel-to-energy parameters during processing of log data to maintain proper peak identification.

Casing correction factors for a 0.280-in.-thick casing were applied during the analysis.

A log overlap, where data were collected at overlapping points in the borehole by separate logging runs, occurred between depths of 18 and 19 ft. The calculated concentrations of the the naturally occurring radionuclides using the separate data sets were within two standard deviations of the measurements (two-sigma or 95-percent confidence level), indicating acceptable repeatability of the measured spectral gamma-ray peaks used in the radionuclide calculations.

Cs-137 was the only man-made radionuclide detected in this borehole. Cs-137 contamination was detected at the ground surface and continuously between depths of 3.5 and 4.5 ft. Measured concentrations in this zone ranged from about 0.5 to 0.7 pCi/g. The maximum measured Cs-137 concentration was about 2 pCi/g at the surface; however, this value is only approximate and probably exceeds the true formation concentration because the configuration of the detector system does not conform to the configuration used in the calibration model.

The logs of the naturally occurring radionuclides show that the K-40 and Th-232 concentrations increase below a depth of about 14 ft. The K-40 concentration background increases abruptly at a depth of about 62 ft. The measured concentrations increase from about 11 pCi/g above this depth to about 17 pCi/g below. The measured U-238 and Th-232 concentrations also increase at this same depth.

The SGLS total count log plot reflects the varying concentrations of the naturally occurring radionuclides and the Cs-137 contamination in the upper portion of the borehole.

Details concerning the interpretation of data for this borehole are presented in the Tank Summary Data Reports for tanks S-105 and S-108.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The naturally occurring radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate concentrations.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence



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intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes both the man-made and naturally occurring radionuclides, the total-count log plot, and the Tank Farm gross-gamma log. The Tank Farm gross-gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma log plot to coincide with the SGLS data.